Is Now Part of

ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
www.onsemi.com

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

FAIRCHILD SEMICONDUCTOR®

May 2007

FDP8447L

N-Channel PowerTrench® MOSFET

40V, 50A, 8.7mΩ

Features

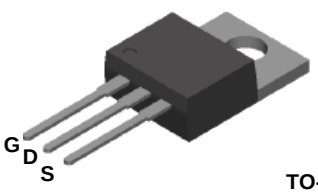
- Max $r_{DS(on)}$ = 8.7mΩ at V_{GS} = 10V, I_D = 14A
- Max $r_{DS(on)}$ = 11.2mΩ at V_{GS} = 4.5V, I_D = 11A
- Fast Switching
- RoHS Compliant

General Description

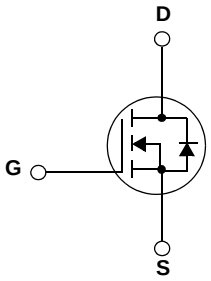
This N-Channel MOSFET has been produced using Fairchild Semiconductor's proprietary PowerTrench technology to deliver low $r_{DS(on)}$ and optimized BV_{DSS} capability to offer superior performance benefit in the application.

Applications

- Inverter
- Power Supplies



TO-220
FDP Series



MOSFET Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter			Ratings	Units
V_{DS}	Drain to Source Voltage			40	V
V_{GS}	Gate to Source Voltage			±20	V
I_D	Drain Current -Continuous (Package limited)	T_C = 25°C		50	A
	-Continuous (Silicon limited)	T_C = 25°C		65	
	-Continuous	T_A = 25°C	(Note 1)	12	
	-Pulsed			100	
E_{AS}	Drain-Source Avalanche Energy		(Note 3)	153	mJ
P_D	Power Dissipation	T_C = 25°C		60	W
	Power Dissipation	T_A = 25°C	(Note 1)	2	
T_J, T_{STG}	Operating and Storage Junction Temperature Range			-55 to +150	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.1	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1)	62.5	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDP8447L	FDP8447L	TO-220AB	Tube	N/A	50units

Electrical Characteristics T_J = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	40			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250μA, referenced to 25°C		34		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 32V,			1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
On Characteristics						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	1	1.7	3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 250μA, referenced to 25°C		-6		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10V, I_D = 14A		7.7	8.7	mΩ
		V_{GS} = 4.5V, I_D = 11A		8.9	11.2	
		V_{GS} = 10V, I_D = 14A, T_J = 125°C		12.1	13.7	
g_{FS}	Forward Transconductance	V_{DD} = 5V, I_D = 14A		74		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 20V, V_{GS} = 0V, f = 1MHz		1880	2500	pF
C_{oss}	Output Capacitance			245	325	pF
C_{rss}	Reverse Transfer Capacitance			150	225	pF
R_g	Gate Resistance	f = 1MHz		1.4		Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 20V, I_D = 14A, V_{GS} = 10V, R_{GEN} = 6Ω		9	18	ns
t_r	Rise Time			7	14	ns
$t_{d(off)}$	Turn-Off Delay Time			28	45	ns
t_f	Fall Time			4	10	ns
Q_g	Total Gate Charge	V_{GS} = 0V to 10V, V_{DD} = 20V, I_D = 14A		35	49	nC
Q_g	Total Gate Charge	V_{GS} = 0V to 5V, V_{DD} = 20V, I_D = 14A		19	27	nC
Q_{gs}	Gate to Source Charge	V_{DD} = 20V, I_D = 14A		4.7		nC
Q_{gd}	Gate to Drain “Miller” Charge	V_{DD} = 20V, I_D = 14A		6.2		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0V, I_S = 14A (Note 2)		0.8	1.2	V
t_{rr}	Reverse Recovery Time	I_F = 14A, di/dt = 100A/μs		28	42	ns
Q_{rr}	Reverse Recovery Charge			22	33	nC

NOTES:

1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to- ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user’s board design.
2. Pulse Test: Pulse Width < 300μs, Duty cycle < 2.0%.
3. Starting T_J = 25°C, L = 1mH, I_{AS} = 17.5A, V_{DD} = 40V, V_{GS} = 10V.

Typical Characteristics T_J = 25°C unless otherwise noted

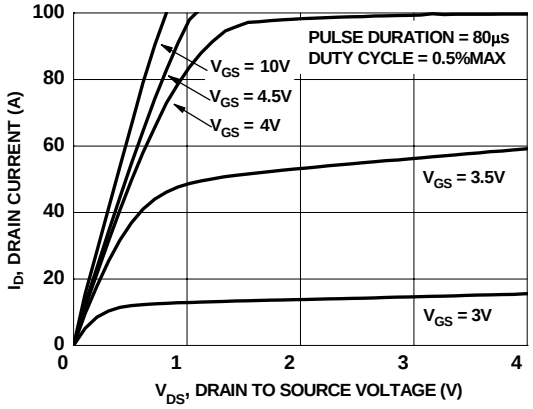


Figure 1. On-Region Characteristics

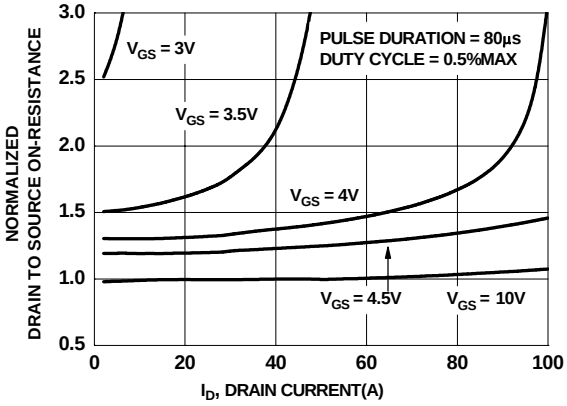


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

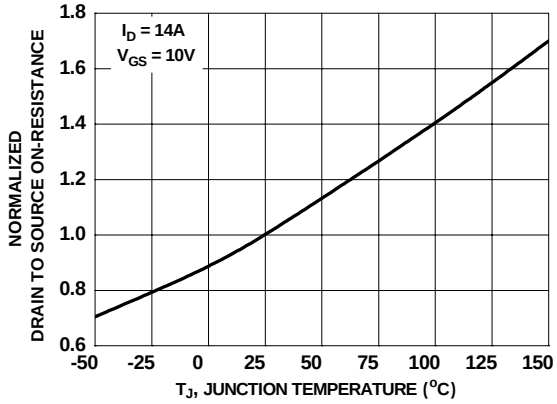


Figure 3. Normalized On-Resistance vs Junction Temperature

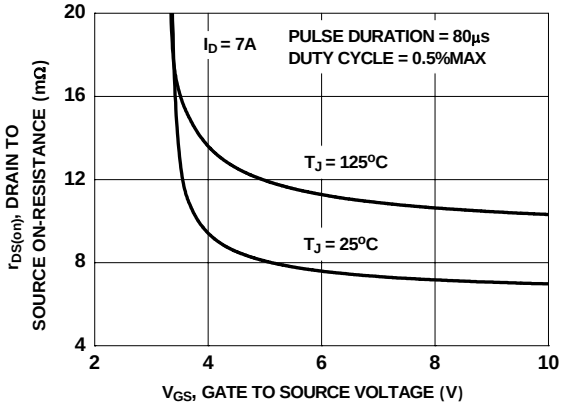


Figure 4. On-Resistance vs Gate to Source Voltage

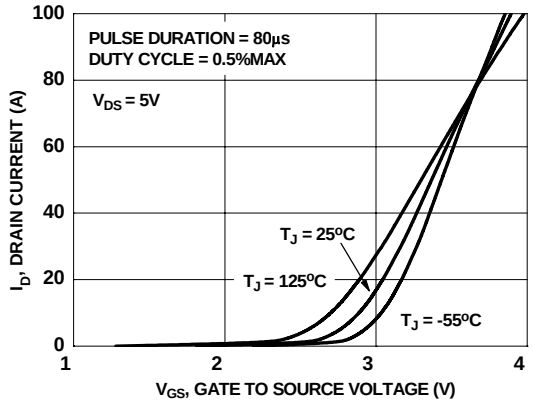


Figure 5. Transfer Characteristics

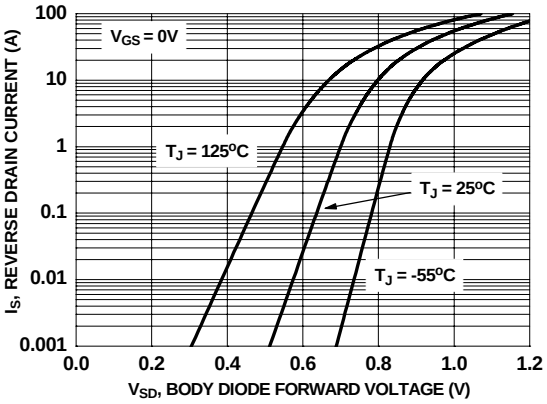


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics T_J = 25°C unless otherwise noted

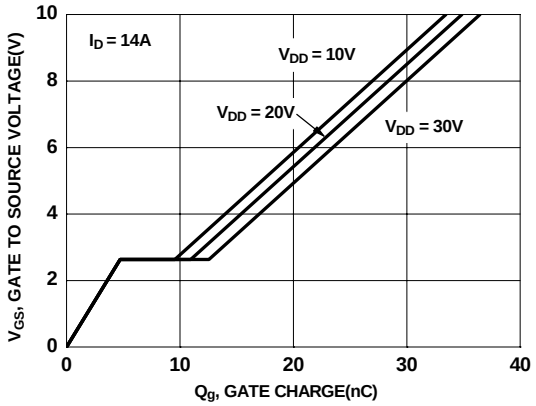


Figure 7. Gate Charge Characteristics

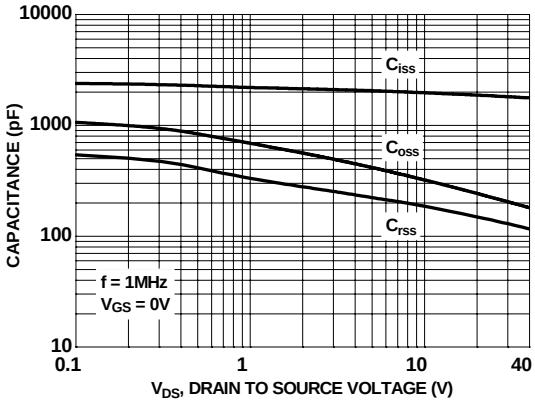


Figure 8. Capacitance vs Drain to Source Voltage

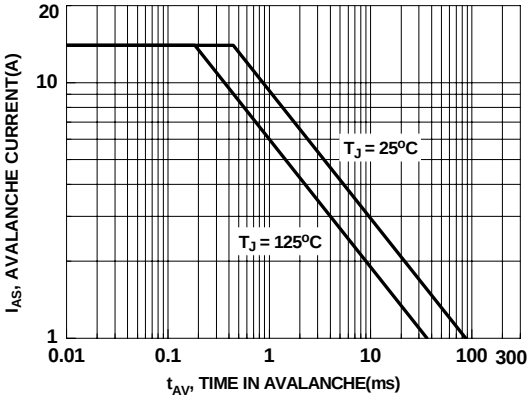


Figure 9. Unclamped Inductive Switching Capability

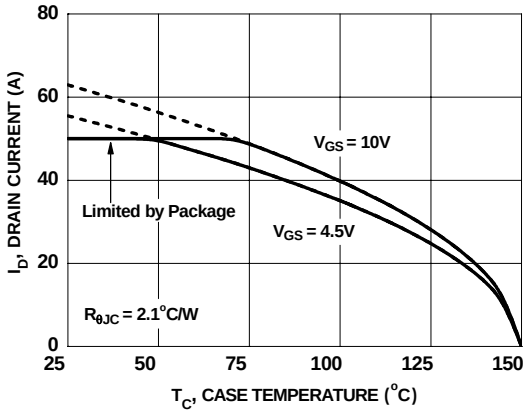


Figure 10. Maximum Continuous Drain Current vs Case Temperature

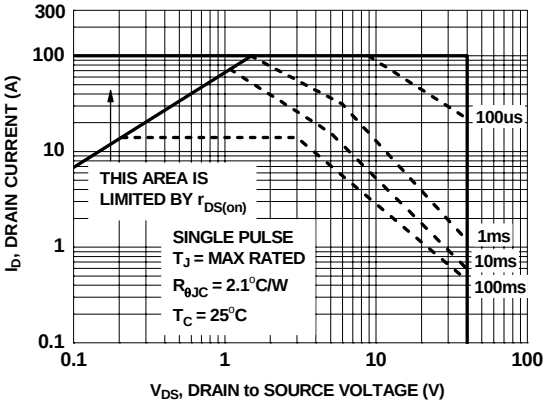


Figure 11. Forward Bias Safe Operating Area

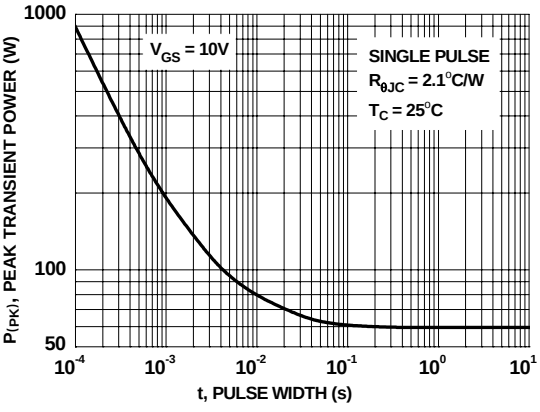


Figure 12. Single Pulse Maximum Power Dissipation

Typical Characteristics T_J = 25°C unless otherwise noted

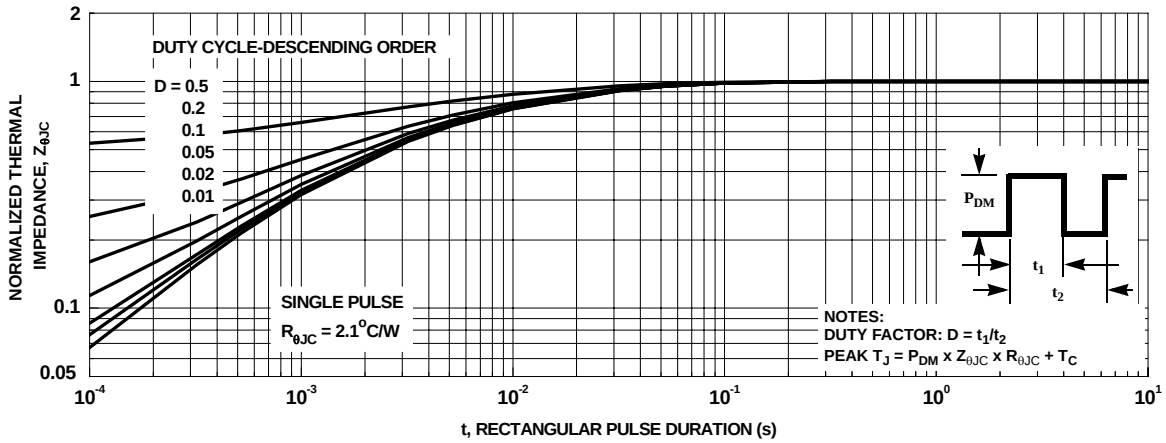


Figure 13. Transient Thermal Response Curve

FAIRCHILD
SEMICONDUCTOR®

TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx®	HiSeC™	Power-SPM™	TinyBuck™
Across the board. Around the world™	*i-Lo*™	PowerTrench®	TinyLogic®
ActiveArray™	ImpliedDisconnect™	Programmable Active Droop™	TINYOPTO™
Bottomless™	IntelliMAX™	QFET®	TinyPower™
Build it Now™	ISOPLANAR™	QS™	TinyWire™
CoolFET™	MICROCOUPLER™	QT Optoelectronics™	TruTranslation™
CorePLUS™	MicroPak™	Quiet Series™	µSerDes™
CROSSVOLT™	MICROWIRE™	RapidConfigure™	UHC®
CTL™	Motion-SPM™	RapidConnect™	UniFET™
Current Transfer Logic™	MSX™	ScalarPump™	VCX™
DOME™	MSXPro™	SMART START™	Wire™
E^2CMOS™	OCX™	SPM®	
EcoSPARK®	OCXPro™	STEALTH™	
EnSigna™	OPTOLOGIC®	SuperFET™	
FACT Quiet Series™	OPTOPLANAR®	SuperSOT™-3	
FACT®	PACMAN™	SuperSOT™-6	
FAST®	PDP-SPM™	SuperSOT™-8	
FASTr™	POP™	SyncFET™	
FPS™	Power220®	TCM™	
FRFET®	Power247®	The Power Franchise®	
GlobalOptoisolator™	PowerEdge™	™	
GTO™	PowerSaver™	TinyBoost™	

PRODUCT STATUS DEFINITIONS
Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild Semiconductor.The datasheet is printed for reference information only.

Rev. I27

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

ON Semiconductor:

FDP8447L